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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,382	01/26/2004	Iain McCulloch	MERCK-2819	4574
23599	7590	05/15/2006	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201			THOMAS, JAISON P	
			ART UNIT	PAPER NUMBER
			1751	

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/763,382	MCCULLOCH ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Jaison P. Thomas	1751	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 14-26 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-13 and 27-30, drawn to polymer compositions and methods of making, classified in class 252, subclass 502.
  - II. Claims 14 and 15, drawn to monomers and a polymerizable material from the monomer, classified in class 526, subclass 72+.
  - III. Claims 16-26, drawn to various electronic devices using the polymer of Claim 1, classified in class 257, subclass 40+.
2. Inventions I and II are directed to related products. The related inventions are distinct if the inventions as claimed do not overlap in scope, i.e., are mutually exclusive; the inventions as claimed are not obvious variants; and the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect. See MPEP § 806.05(j). In the instant case, the monomers can be used as dopant additives alone without polymerizing the monomer.
3. Inventions (I and II) and III are related as mutually exclusive species in an intermediate-final product relationship. Distinctness is proven for claims in this relationship if the intermediate product is useful to make other than the final product, and the species are patentably distinct (MPEP § 806.05(j)). In the instant case, the intermediate product is deemed to be useful as an optical medium for optical switches or light modulation devices and the inventions are deemed patentably distinct because there is nothing on this record to show them to be obvious variants.

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4. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification and because the inventions require a different field of search, restriction for examination purposes as indicated is proper.

5. This application contains claims directed to the following patentably distinct species:

- I) Claim 11, Formula IIIa
- II) Claim 11, Formula IIIb
- III) Claim 11, Formula IVa
- IV) Claim 11, Formula Va
- V) Claim 11, Formula VIa
- VI) Claim 11, Formula VIIa
- VII) Claim 11, Formula VIIIa
- VIII) Claim 11, Formula IXa

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 1-30 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species.

MPEP § 809.02(a).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

6. During a telephone conversation with John Sopp on March 27, 2006 a provisional election was made with traverse to prosecute the invention of Group I, Claims 1-13 and 27-30 and Species II. Affirmation of this election must be made by

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applicant in replying to this Office action. Claims 14-26 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

8. Note that elected species IIIb and examined species IIIa are allowed (see pg. 9 of this action for further discussion).

9. Accordingly, Examiner has selected IVa as additional searchable species. Species Va, VIa, and VIIa remain non-elected.

### ***Claim Rejections - 35 USC § 112***

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 7 recites the limitation "according to Claim 2, wherein the spacer group is of formula II" in Claim 7, lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

For purposes of examination, Claim 7 will be construed to depend on Claim 3, formula I.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1, 2, 5, 6, 7, 10, 11, 28, 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Harelstad et al. (US Patent No. 5,185,102).

Harelstad et al. teaches a polymeric complex that has a repeating unit disclosed in Formula 1 (Column 4, line 65). M is defined as a monomer, P is a pendant group that has electron donating or accepting properties, and D is a dopant molecule capable of forming a complex with the pendant group P (Column 5, lines 1-7). The resulting polymer can have anywhere from 5 to 5000 of these units and can have molecular weight range of 1,500 to 5 million (Column 5, lines 8-10). Monomer units that can be used in the polymer backbone include alkyl acrylates, acrylamides and polyamides (Column 5, lines 37-60). The reference teaches either homopolymers or copolymers "with varying pendant groups to optimize both nonlinear optical and physical properties" (Column 5, lines 66-69) and copolymers can be prepared from any monomer that is copolymerizable with M, such as any "ethylenically unsaturated monomer" (Column 6, lines 1-3). A variety of pendant groups having both electron accepting and electron donating properties are disclosed. Preferred electron donating groups include fluorenyl groups (Column 6, lines 26-28) and electron accepting groups can include quinones or tetracyanonquinodimethanes wherein such groups can be substituted with electron

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withdrawing groups including cyano and nitro groups (Column 6, lines 49-57). Halstead also teaches methods of covalently attaching electron accepting groups to a polymer main chain (Column 10, lines 1-54).

The reference is anticipatory.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 3, 4, 8, 9, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harelstad et al.

Harelstad is relied upon as discussed above however Harelstad does not teach the specific structure of polymer as disclosed in the instant Claim 3 nor does Harelstad teach the specific number of subunits in the polymer as required by instant Claim 4. Harelstad does not teach the use of spacer groups as required by instant Claim 8 nor does Harelstad teach the use of a naphthoquinone structure as an electron accepting group as required by instant Claim 9. Further Harelstad does not explicitly disclose a method of making the structure of Claim 3 as required by instant Claim 30.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the polymeric structure, methods of making such a structure, and the substituted quinones of Harelstad through routine experimentation for



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best results. As to optimization results, a patent will not be granted based upon the optimization of result effective variables when the optimization is obtained through routine experimentation unless there is a showing of unexpected results which properly rebuts the prima facie case of obviousness. See *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). See also *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990), and *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

16. Claims 12, 13 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harelstad et al. in view of Höpken (Höpken et al., "Low surface energy polystyrene," *Macromolecules*, 1992, pp. 1461-1467).

Harelstad is relied upon as discussed above. However, Harelstad does not teach the use of functional groups that modify or lower the surface energy of the polymer.

Höpken teaches "polymers with highly fluorinated side chains have found a number of applications based on properties which are a consequence of the low surface energy of these materials" (Introduction).

It would have been obvious to one of ordinary skill in the art at the time the invention was made that the use of the fluoroenyl functional group disclosed in Harelstad mentioned above in the polymer taught would have the effect of modifying and lowering the surface energy of the resulting polymeric compositions of Harelstad.

***Allowable Subject Matter***

17. Claim 3 rewritten in independent form with the limitations of Species IIIa or IIIb from Claim 11 as the electron accepting group and any species in Claim 8 as the spacer group, and all claims limited as such, would be allowable over the prior art of record. The prior art does not teach nor does it reasonably suggest naphthoquinone or substituted naphthoquinones attached to a polymer backbone via a spacer group or methods of making.

***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The references are considered cumulative to or less material than those discussed above.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaison P. Thomas whose telephone number is (571) 272-8917. The examiner can normally be reached on Mon-Fri 8:30 am to 5:00 pm.

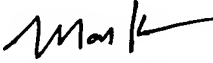
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on (571) 272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JT  
Jaison Thomas  
Examiner  
4/17/2006

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Mark Kopec  
Primary Examiner